In 1968, the late Rollo Davidson conjectured that every sufficiently regular stationary line process in the plane should be a mixture of stationary Poisson processes, a so called Cox process. That this is indeed so, and even for k-dimensional flat processes in R^d with $1 \leq k < d$, was proved in increasing generality by Papangelou [1, 4] and Kallenberg [2].

Though theoretically interesting, these results seem to be of limited value from the point of view of applications. (Consider, e.g. the structure of paper, as composed by long but finite and weakly curved fibres.)

Our main result states that, under suitable conditions, a stationary process of bounded smooth k-dimensional surfaces in R^d is asymptotically distributed as a Cox process of flats, as the whole space and the individual surfaces are expanded by constant factors, in such a way that the total intensity remains constant. The proof uses Papangelou's ingenious method of conditional intensities [3, 4].

References

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Censored Data Analysis in Life Testing and Cosmology: Point Process Techniques

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We present a quick review of the point process techniques in the asymptotic theory of censoring. As a consequence, we derive main theorems of R. Gill (1983) and an improvement of the work of M. Woodroofe (1985). We then formulate and indicate a solution of a problem in clinical trials which includes previous results.

On Stable Convergence and a Central Limit Theorem for Point Processes

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A slight extension of the notion of stable convergence in distribution of Aldous and Eagleson (1978) is put forward, and used to extend a Central Limit Theorem of Kutoyants (1978) for point process integrals to the case where random norming may be required.